

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application. Inserted text is indicated with underlining and deleted text is indicated with ~~striketrough~~ or [[double brackets]]. Claim status is indicated as **currently amended**, **original** or **cancelled**. These claim amendments and the new claims do not introduce new matter.

Listing of the Claims:

1. **(currently amended)** A composition comprising an orthogonal aminoacyl-tRNA synthetase (O-RS), wherein the O-RS preferentially aminoacylates an O-tRNA with p-acetyl-L-phenylalanine with an efficiency of at least 50% of the efficiency of a translation system comprising p-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising an amino acid sequence selected from of SEQ ID NO.: 18-20 ~~with a keto-amino acid~~.
2. **(original)** The composition of claim 1, wherein the O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof.
3. **(currently amended)** The composition of claim 1, wherein the O-RS is derived from a Methanococcus ~~Methonococcus~~ jannaschii.
4. **(currently amended)** The composition of claim 1, comprising a cell, wherein said cell comprises said O-RS.
5. **(original)** The composition of claim 4, wherein the cell is an *E. coli* cell.
6. **(original)** The composition of claim 1, comprising a translation system.
7. **(currently amended)** The composition of claim 1, further comprising said ~~an~~ O-tRNA.
8. **(original)** The composition of claim 7, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence of SEQ ID NO.:21.
9. **(currently amended)** A cell comprising a translation system, wherein the translation system comprises:
 - an orthogonal-tRNA (O-tRNA);
 - an orthogonal aminoacyl-tRNA synthetase (O-RS); and,

p-acetyl-L-phenylalanine ~~a keto-amino acid~~;

wherein the ~~O-tRNA recognizes a first selector codon, and the~~ O-RS preferentially aminoacylates the O-tRNA with p-acetyl-L-phenylalanine with an efficiency of at least 50% of the efficiency of a translation system comprising p-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising an amino acid sequence selected from ~~of~~ SEQ ID NO.: 18-20 ~~with the first keto-amino acid.~~

10. (original) The cell of claim 9, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof, and wherein the O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof.

11. (cancelled)

12. (original) The cell of claim 9, wherein the cell is a non-eukaryotic cell.

13. (original) The cell of claim 12, wherein the non-eukaryotic cell is an *E. coli* cell.

14. (currently amended) The cell of claim 9, further comprising a nucleic acid that comprises a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises at least one ~~[[a]]~~ selector codon that is recognized by the O-tRNA.

15. (currently amended) An *E. coli* cell, comprising:

an orthogonal tRNA (O-tRNA);

an orthogonal aminoacyl- tRNA synthetase (O-RS), wherein the O-RS preferentially aminoacylates the O-tRNA with p-acetyl-L-phenylalanine with an efficiency of at least 50% of the efficiency of a translation system comprising p-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising an amino acid sequence selected from ~~of~~ SEQ ID NO.: 18-20 ~~with a keto amino acid~~;

p-acetyl-L-phenylalanine ~~the keto-amino acid~~; and,

a nucleic acid that comprises a polynucleotide that encodes a polypeptide of interest, wherein the polynucleotide comprises at least one ~~the~~ selector codon that is recognized by the O-tRNA.

16. (original) The *E. coli* cell of claim 15, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof, and wherein the O-RS comprises an amino acid sequence comprising any one of SEQ ID NO.: 18-20, or a conservative variation thereof.
17. (original) An artificial polypeptide comprising any one of SEQ ID NO. 18-20.
18. (original) An artificial polynucleotide that encodes a polypeptide of claim 17.
19. (original) A vector comprising or encoding a polynucleotide of claim 18.
20. (original) The vector of claim 19, wherein the vector comprises a plasmid, a cosmid, a phage, or a virus.
21. (original) The vector of claim 19, wherein the vector is an expression vector.
22. (original) A cell comprising the vector of claim 19.
23. (currently amended) A method of producing in a cell a protein of interest ~~in a cell~~ with a p-acetyl-L-phenylalanine keto-amino acid at a specified position, the method comprising:
 - growing, in an appropriate medium, the cell, where the cell comprises a nucleic acid that comprises at least one selector codon at a defined position and encodes the a protein of interest; and,
 - providing in the appropriate medium p-acetyl-L-phenylalanine ~~the keto-amino acid~~;
 - wherein the cell further comprises:
 - an orthogonal tRNA (O-tRNA) that functions in the cell and recognizes the selector codon; and,
 - an orthogonal aminoacyl-tRNA synthetase (O-RS) that preferentially aminoacylates the O-tRNA with p-acetyl-L-phenylalanine with an efficiency of at least 50% of the efficiency of a translation system comprising p-acetyl-L-phenylalanine, said O-tRNA, and a polypeptide comprising an amino acid sequence selected from ~~of~~ SEQ ID NO.: 18-20 ~~with the keto-amino acid~~; and
 - incorporating p-acetyl-L-phenylalanine ~~the keto-amino acid~~ at ~~into~~ the specified position in the protein of interest during translation of the protein of interest, nucleic acid with ~~wherein~~ the defined position of said at least one selector codon in said nucleic acid corresponds to said

specified position of *p*-acetyl-L-phenylalanine in said protein of interest, thereby producing the protein of interest with *p*-acetyl-L-phenylalanine at the specified position.

24. (currently amended) The method of claim **23**, wherein the O-RS comprises an amino acid sequence which comprises any one of SEQ ID NO.: 18-20, or a conservative variation thereof.

25. (original) The method of claim **23**, wherein the O-tRNA comprises or is encoded by a polynucleotide sequence as set forth in SEQ ID NO.: 21, or a complementary polynucleotide sequence thereof.

26. (original) The method of claim **23**, wherein the cell is a non-eukaryotic cell.

27. (original) The method of claim **26**, wherein the non-eukaryotic cell is an *E. coli* cell.

28. (cancelled)